U.S. DEPARTMENT OF COMMERCE/ National Oceanic and Atmospheric Administration

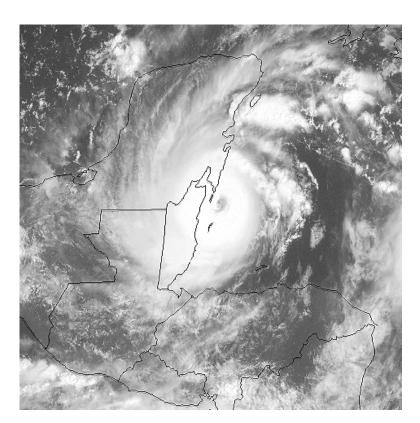


THEN OF COMMERCE \* FOUNDAMENCE \* FOUNDAMENCE

OFFICE OF THE FEDERAL COORDINATOR FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

# National Hurricane Operations Plan

FCM-P12-2001



Washington, DC May 2001

Hurricane Keith - 1 October 2000

## THE FEDERAL COMMITTEE FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH (FCMSSR)

MR. SCOTT B. GUDES, Chairman

Department of Commerce

DR. ROSINA BIERBAUM

Office of Science and Technology Policy

DR. RAYMOND MOTHA Department of Agriculture

MR. JOHN J. KELLY, JR. Department of Commerce

CAPT FRANK GARCIA, USN Department of Defense

DR. ARISTIDES PATRINOS Department of Energy

DR. ROBERT M. HIRSCH Department of the Interior

MR. RALPH BRAIBANTI Department of State

MR. RANDOLPH LYON
Office of Management and Budget

MR. MONTE BELGER Department of Transportation

MS. MARGARET LAWLESS (Acting)
Federal Emergency Management Agency

DR. GHASSEM R. ASRAR National Aeronautics and Space Administration

DR. MARGARET S. LEINEN National Science Foundation

MR. PAUL MISENCIK National Transportation Safety Board

MR. ROY P. ZIMMERMAN U.S. Nuclear Regulatory Commission

DR. JOEL SCHERAGA (Acting) Environmental Protection Agency

MR. SAMUEL P. WILLIAMSON Federal Coordinator

MR. JAMES B. HARRISON, Executive Secretary Office of the Federal Coordinator for Meteorological Services and Supporting Research

## THE INTERDEPARTMENTAL COMMITTEE FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH (ICMSSR)

MR. SAMUEL P. WILLIAMSON, Chairman

Federal Coordinator

DR. RAYMOND MOTHA Department of Agriculture

MR. JOHN E. JONES, JR. Department of Commerce

CAPT FRANK GARCIA, USN Department of Defense

MR. RICKEY PETTY Department of Energy

MR. LEWIS T. MOORE Department of the Interior

MR. JEFFREY MACLURE Department of State

MR. DAVID WHATLEY Federal Aviation Administration Department of Transportation DR. JONATHAN M. BERKSON United States Coast Guard Department of Transportation

DR. JOEL SCHERAGA (Acting) Environmental Protection Agency

MR. JOHN GAMBEL

Federal Emergency Management Agency

DR. RAMESH KAKAR National Aeronautics and Space Administration

DR. JARVIS MOYERS National Science Foundation

MR. DONALD E. EICK

National Transportation Safety Board

MS. LETA A. BROWN

U.S. Nuclear Regulatory Commission

MS. JENNIFER BAFFI

Office of Management and Budget

MR. JAMES B. HARRISON, Executive Secretary Office of the Federal Coordinator for Meteorological Services and Supporting Research

# FEDERAL COORDINATOR FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

8455 Colesville Road, Suite 1500 Silver Spring, Maryland 20910

### NATIONAL HURRICANE OPERATIONS PLAN

FCM-P12-2001

Washington, D.C. May 2001

## **CHANGE AND REVIEW LOG**

Use this page to record changes and notices of reviews.

Change	Page	Date	
Number	Numbers	Posted	Initial
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
	Changes are indicated by a change or by shading and st	vertical line in the margin next to the crikeouts.	
Review Date		Comments	Initial
- <u>-</u>			
·			

#### **FOREWORD**

The Interdepartmental Hurricane Conference (IHC) is sponsored annually by the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM) with the goal to bring together the cognizant Federal agencies, together with representatives from the user communities, especially the emergency management community, to address and reach agreement on items of mutual interest and concern related to the provision of hurricane/tropical cyclone forecast and warning services. The procedures and agreements reached at the 55th IHC, which was held in Orlando, Florida, March 5-9, 2001, resulted in this publication--the 39th edition of the *National Hurricane Operations Plan* (NHOP).

This edition includes a number of revisions and changes. Twelve action items were addressed during an open meeting of the Working Group for Hurricane and Winter Storms Operations and Research (WG/HWSOR). Seven of the twelve items were closed through incorporation into the NHOP as approved recommendations and/or changes. Of the remaining five, two action items were for information only, and three were non-NHOP related and are being staffed by the WG/HWSOR. The action items will be published in the *Minutes of the 55<sup>th</sup> Interdepartmental Hurricane Conference*.

Appendix A on local National Weather Service (NWS) Office products, which was new to the NHOP last year, was updated with a new table, indicating how tropical cyclone watch/warning-related products are issued for local users. Chapter 3, *General Operations and Procedures of the National Weather Service Hurricane Centers*, includes a significant revision of abbreviated communications headings. In Chapter 5, *Aircraft Reconnaissance*, the section on Air Traffic Control (ATC) Clearances was updated to incorporate revised procedures between the Federal Aviation Administration (FAA), the National Oceanic and Atmospheric Administration (NOAA), the Air Force Reserve Command (AFRC), and the National Aeronautics and Space Administration (NASA), regarding weather reconnaissance and research operations. Chapter 8 was retitled--*National Data Buoy Capabilities and Requirements*--and includes new documentation on the Navy's drifting buoy program. Chapter 6, *Satellite Reconnaissance*, and Chapter 9, *Marine Weather Broadcasts*, were also substantially updated.

The 2000 season, which included Hurricane Keith whose name was retired, was both active and unusual from the standpoint that the United States experienced no landfalling hurricanes. The season, however, put our multiagency tropical cyclone warning support system to the test, and, once again, the system superbly responded--a tribute to the professionalism, dedication, and cooperation of the civilian and military agencies involved.

Samuel P. Williamson Federal Coordinator for Meteorological Services and Supporting Research

## NATIONAL HURRICANE OPERATIONS PLAN

## **TABLE OF CONTENTS**

			Page
CHANGE AN	D REV	IEW LOG	ii
FOREWORD			iii
TABLE OF CO	ONTEN	NTS	v
CHAPTER 1	INTI	RODUCTION	1-1
	1.1.	General	
	1.2.	Scope	
CHAPTER 2	RES	PONSIBILITIES OF COOPERATING FEDERAL AGENCIES	. 2-1
	2.1.	General	2-1
	2.2.	DOC Responsibilities	2-1
	2.3.	DOD Responsibilities	2-4
	2.4.	DOT Responsibilities	2-5
	2.5.	Annual Liaison with Other Nations	2-5
	2.6.	Air Traffic Control/Flight Operations Coordination	2-5
CHAPTER 3	GEN	ERAL OPERATIONS AND PROCEDURES OF THE NATION	AL
	WEA	ATHER SERVICE HURRICANE CENTERS	3-1
	3.1.	General	3-1
	3.2.	Products	
	3.3.	Designation of Tropical and Subtropical Cyclones	3-4
	3.4.	Transfer of Warning Responsibility	3-6
	3.5.	Alternate Warning Responsibilities	3-6
	3.6.	Abbreviated Communications Headings	. 3-11
CHAPTER 4		IONAL WEATHER SERVICE PRODUCTS FOR THE	
	DEP	ARTMENT OF DEFENSE	4-1
		General	
	4.2.	Observations	
	4.3.	Tropical Cyclone Forecast/Advisories	4-1
CHAPTER 5		CRAFT RECONNAISSANCE	
	5.1.	General	
	5.2.	Responsibilities	
	5.3.	Control of Aircraft	5-3

	5.4.	Reconnaissance Requirements	5-3
	5.5.	Reconnaissance Planning and Flight Notification	
	5.6.	Reconnaissance Effectiveness Criteria	. 5-19
	5.7.	Aerial Reconnaissance Weather Encoding, Reporting,	
		and Coordination	. 5-20
	5.8.	Operational Flight Patterns	
	5.9.	Aircraft Reconnaissance Communications	
CHAPTER 6	SATELLITE SURVEILLANCE OF TROPICAL AND SUBTROPICAL		
	CYC	LONES	6-1
	6.1.	Satellites	6-1
	6.2.	National Weather Service (NWS) Support	6-5
	6.3.	NESDIS Satellite Analysis Branch (SAB)	6-6
	6.4.	Air Force Support and the Defense Meteorological	
		Satellite Program (DMSP)	6-6
	6.5.	Satellites and Satellite Data Availability for the	
		Current Hurricane Season	6-9
	6.6.	Current Intensity and Tropical Classification Number	. 6-13
CHAPTER 7	SURI	FACE RADAR REPORTING	7-1
	7.1.	General	7-1
	7.2.	The WSR-88D	7-1
	7.3.	Procedures	7-1
CHAPTER 8	NAT	IONAL DATA BUOY CAPABILITIES AND REQUIREMENT	S 8-1
	8.1.	General	
	8.2.	Requests for Drifting Buoy Deployment	
	8.3.	Communications	8-2
CHAPTER 9	MAR	TINE WEATHER BROADCASTS	9-1
	9.1.	General	
	9.2.	Global Maritime Distress and Safety System	
		(GMDSS)	9-1
	9.3.	Coastal Marine Safety Broadcasts	
	9.4.	High Seas Broadcasts	
	9.5.	Additional Information	9-3
CHAPTER 10		LICITY	
		News Media Releases	
	10.2.	Distribution	. 10-1
APPENDIX A		AL NATIONAL WEATHER SERVICE (NWS) OFFICE	
	PRO]	DUCTS	. A-1

APPENDIX B	WARNINGS	B-1
APPENDIX C	JOINT TYPHOON WARNING CENTER (JTWC) BULLETINS	C-1
APPENDIX D	FORMAT FOR NHOP/NWSOP FLIGHT INFORMATION FOR INTERNATIONAL AND DOMESTIC NOTAM ISSUANCE	D-1
APPENDIX E	SAFFIR-SIMPSON HURRICANE SCALE	E-1
APPENDIX F	OFFICIAL INTERAGENCY AGREEMENTS	F-1
APPENDIX G	RECCO, HDOB, MINOB, AND TEMP DROP CODES, TABLES, AND REGULATIONS	
APPENDIX H	WSR-88D OPERATIONS PLAN FOR TROPICAL CYCLONE EVENTS	H-1
APPENDIX I	TELEPHONE AND TELETYPE LISTING	I-1
APPENDIX J	PHONETIC PRONUNCIATION LISTING	J-1
APPENDIX K	ACRONYMS/ABBREVIATIONS	K-1
APPENDIX L	GLOSSARY	L-1
APPENDIX M	DISTRIBUTION	M-1

### LIST OF FIGURES

Figure		Page
1-1.	Tropical cyclone forecast centers' areas of responsibility	1-2
2-1.	Super Typhoon Bilis, August 21, 2000	
4-1.	Tropical cyclone forecast/advisory format	4-3
4-2.	Tropical cyclone public advisory format	
5-1.	WC-130 Weather Reconnaissance Aircraft	
5-2.	G-IV Weather Surveillance Aircraft	5-2
5-3.	NOAA P-3 Weather Surveillance Aircraft	
5-4.	Vortex data message worksheet	5-8
5-5.	Supplementary vortex data message	5-9
5-6.	Example Vortex Data Message (VDM) and Supplementary Vortex Data	
	Message (SVDM) for the WC-130H and WC-130J	5-13
5-7.	NHOP coordinated request for aircraft reconnaissance	5-14
5-8.	Tropical cyclone plan of the day format	
5-9.	Mission evaluation form	5-21
5-10.	Flight pattern ALPHA	5-24
5-11.	Suggested patterns for investigative missions	5-25
5-12.	Schematic of aircraft-to-satellite data link for NOAA P-3 aircraft	5-28
5-13.	Schematic of aircraft-to-satellite data link for AFRC WC-130 aircraft	5-29
6-1.	The GOES satellite system	6-2
6-2.	Center fix data form and message format (satellite)	
8-1.	NDBC moored buoy locations in the Atlantic Ocean, the Gulf of Mexico,	
	and the Great Lakes	8-5
8-2.	NDBC moored buoys in the Pacific Ocean	8-6
8-3.	C-MAN stations in the coastal U.S	8-7
8-4.	NDBC planned and current Gulf of Mexico moored buoy network	8-8
8-5.	Drifting data buoy deployment patterns	8-9
G-1.	Reconnaissance code recording form	G-2
G-2.	HDOB Description and Sample Messages	G-6
G-3.	MinOb Description and Sample Message	G-8
G-4.	Example TEMP DROP Message for Tropical Cyclone Operations	G-17

## LIST OF TABLES

Table		Page
3-1.	Atlantic Tropical Cyclone Names	3-7
3-2.	Eastern Pacific Tropical Cyclone Names	
3-3.	Central Pacific Tropical Cyclone Names	3-9
3-4.	International Tropical Cyclone Names for the Western Pacific and	
	South China Sea	3-10
5-1.	Requirement for aircraft reconnaissance data	5-6
5-2.	Vortex data message entry explanation	
6-1.	Communications headings for satellite tropical weather discussion summaries .	6-7
6-2.	Satellite and satellite data availability for the current hurricane season	6-9
6-3.	The empirical relationship between the C.I. number and the maximum wind speed and the relationship between the T-number and the minimum	
	sea-level pressure	6-13
7-1.	Participating radar stations	7-2
8-1.	Moored buoy locations and configurations	8-3
8-2.	C-MAN sites	8-4
8-3.	Code forms for moored data buoys, C-MAN stations, and drifting buoys	8-10
G-1.	Reconnaissance code tables	G-3
G-2.	Reconnaissance code regulations	G-4
G-3.	HDOB Message Format	G-7
G-4.	NOAA MinOb Message Format	G-9
G-5.	TEMP DROP code	. G-10